- an affidavit stating that the substitute specification contains no new matter;
- a substitute specification including claims; and
- a marked up version of the substitute specification showing the amendments to be made (in this case the new claims) via the substitute specification relative to the specification of record.

In the claims:

Please add the following new claims.

*14.   (New) A method for early culling of occluded objects, comprising:

a)   ordering all objects, the objects being included in an image being rendered, according to their distance from eye point, comprising:

   i)   logically dividing area of the image into a coarse Z-buffer, the coarse Z-buffer including a series of tiles, the tiles being arranged in a rectangular grid, wherein the grid may have different resolutions, and wherein each tile has an associated depth value, the depth value being a Z-buffer value farthest from the eye that is included within that tile;

   ii)   constructing a surrogate volume for each object of the image, wherein each surrogate volume is a three-dimensional object that is just large enough to contain the object being ordered and wherein each surrogate volume may span only one tile of an appropriate resolution;

   iii)   determining a depth value of the surrogate volume that is nearest to eye of a viewer;

   iv)   determining a depth value of the one tile that includes the surrogate volume;

   v)   comparing the depth value of the surrogate volume versus the depth value of the tile including the surrogate volume;

b)   culling the objects whose surrogate volume has a depth value farther from the eye than the depth value of the tile, including the surrogate volume, after a single comparison; and

c)   rendering the objects whose surrogate volume has a depth value closer to the eye than the depth value of the tile, including the surrogate volume, or equidistant to the eye with the depth value of the tile including the surrogate volume.

*15.   (New) The method of claim 14, wherein a surrogate volume may span several tiles and further comprising:

comparing the depth value of the surrogate volume with each of the spanning tiles; and

culling the objects whose surrogate volume has a depth value farther from the eye than the depth value of the tiles including the surrogate volume; and

rendering the objects whose surrogate volume has a depth value closer to the eye than the depth value of at least one of the tiles including the surrogate volume or is equidistant to the eye with at least one of the tiles including the surrogate volume.

*16.   (New) The method of claim 14, further comprising:

subdividing the objects that are not occluded into smaller objects; and

determining if the smaller objects are occluded.

*17.   (New) The method of claim 14, wherein

each coarse Z-buffer is replicated one or more times at different resolutions,

each separate coarse Z-buffer spans the image using a different resolution,

the number of tiles in the coarse Z-buffers of various resolutions remains constant,

for lower resolution coarse Z-buffers, each tile covers a larger area of the image,

for lower resolution coarse Z-buffers, the tiles overlap one another,

center points of successive resolutions of tiles of the coarse Z-buffers are offset from the center points of preceding resolutions of tiles,

lower resolution tiles of the coarse Z-buffers split the image between tiles with overlap,

a higher resolution coarse Z-buffer splits the image between tiles with no overlap, and

a host processor is allowed to select a resolution that corresponds to a size of any given object.

*18.   (New) A system comprising:

a memory for storing depth values, wherein the depth values are derived by:

a)   ordering all objects, the objects being included in an image being rendered, according to their distance from eye point, comprising: